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Phylogenetic and Taxonomic Studies on *Helonias*, *Ypsilandra* and *Heloniopsis*
III. Taxonomic Revision

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The three genera, *Helonias*, *Ypsilandra* and *Heloniopsis* have not sufficient differences to be distinguished from each other in generic rank. Accordingly the three genera were unified into one genus. *Heloniopsis* and *Ypsilandra* were reduced to *Helonias*. The following taxonomic reductions were also made in this paper; i.e., both *Y. cavaleriei* and *Y. kansuensis* were reduced to *Helonias thibetica*; both *Heloniopsis arisanensis* and *Heloniopsis taiwanensis* to *Helonias umbellata*; *Y. yunnanensis* var. *himalaica* to *Helonias yunnanensis*; *Sugerokia nipponica*, *Heloniopsis japonica* var. *flavida*, *H. japonica* var. *albiflora* and *H. japonica* var. *tessellata* to *Helonias breviscapa*. Floral colour variants were not distinguished as distinct taxa. As a result, a total of nine species were recognized in the emended *Helonias*. Eight new names were produced as a consequence of the transference of both *Ypsilandra* and *Heloniopsis* to *Helonias*.

(Continued from J. Jpn. Bot. **72**: 329–336, 1997)

According to my previous studies (Tanaka 1997a, 1997c–e), *Helonias* and *Ypsilandra* differ mainly in the following characters; i.e., the morphology of seeds, the number of ovules per loculus of an ovary, the number of flowers per scape, and the presence or absence of a longitudinal furrow between thecae on the ventral side of anthers. As for the third character, there is some overlap in the range of variation between the two genera (Tanaka 1997d). All these differences seem not to be sufficient for the generic demarcation of these plants.

Meanwhile, as for *Ypsilandra* and *Heloniopsis*, the following differences are known to exist between the two genera. That is, in *Ypsilandra* the inner filaments are adnate basally to the ovary, while in *Heloniopsis* they are free from the ovary (Tanaka 1997c, 1997e). However, in some species of *Heloniopsis* like *H. kawanoi*, the basal part of the inner filaments is located very close to that of the ovary, and this state does not differ so markedly from that in *Ypsilandra* in which the two floral organs are adnate to each other only very shortly at their bases. Accordingly, the difference concerning the adnation of these two floral organs between the two genera seems not so great virtually and may not be worthy of generic delimitation. Meanwhile, both the inner and outer filaments of *Ypsilandra* are not adnate to tepals, while those of the two species of *Heloniopsis* (*H. orientalis* and *H. breviscapa*) are adnate basally to their corresponding tepals (Tanaka 1997b, 1997c, 1997e). Franchet (1887) earlier noted that there is this difference between the two genera. However, it was later disclosed that there are also three other species in *Heloniopsis* whose filaments are not adnate to tepals (Tanaka 1997b, 1997c, 1997e). Therefore, the presence or absence of the adnation between these two floral organs (filaments and tepals) cannot be regarded as an intergeneric difference in this case. As regards the anthers, *Ypsilandra* has perfectly unilocular anthers, while *Heloniopsis* has virtually bilocular anthers. It is a noteworthy fact that *Heloniopsis* still retains traces of a thecal confluence at the apex of the anthers. Especially in some species like *H. leucantha*, the traces appear to be relatively well retained. As far as the anthers of these species of *Heloniopsis* are compared with those of *Ypsilandra*, the gap between the two genera seems not so deep substantially (Tanaka 1997c).

Gray (1859) once pointed out that there is a difference in the stylar structure between *Helonias* and *Heloniopsis*. But, later it was proven that the stylar structure varies transitionally from that of *Helonias* through *Ypsilandra* to that of *Heloniopsis* (Tanaka 1997a, 1997c, 1997e). Therefore, what Gray observed was the two extremes of an almost continuous variation in this structure. Gray (1859) also pointed out that *Helonias* and *Heloniopsis* differ in seed character, but later it turned out that the seeds he examined as those of *Heloniopsis* were, in fact, not those of *Heloniopsis*, but those of a species of *Luzula* (Koidzumi 1930, 1934, Hara 1947). Therefore, Gray's description of the seeds of *Heloniopsis* must have been nullified. Without knowing this fact, Miquel (1867)[1)] set up a new genus *Sugerokia*, because his material differed especially in the seed character from Gray's *Heloniopsis*. Both *Sugerokia* and *Heloniopsis* were based on specimens from Japan, and it is evident that they are the same genus, as many taxonomists have earlier pointed out (Maximowicz 1867, Baker 1874, 1879, Franchet and Savatier 1877[2)], Bentham 1883, Engler 1888, Koidzumi 1930, Krause 1930, Nakai 1933, Honda 1938, Hara 1947, Ohwi 1953, 1965, Chen 1980).

All the differences so far known to exist between the three genera seem not to deserve a generic delimitation. They possess many characters in common and closely resemble each other in basic habits. It seems more appropriate to treat them in one genus, as Kawano (in Kawano and Masuda 1980) earlier suggested. In this paper I attempted to revise the taxonomy of this plant group, including the unification of the three genera into one genus.

Genus *Helonias*

Helonias L.[3)], Sp. Pl., ed. 1, **1**: 342 (1753), ed. 2, **1**: 485 (1762), p.p., excl. Plukenet; Gen. Pl., ed. 5, **1**: 159 (1754), ed. 6, **1**: 180 (1764); Amoen. Acad. **3**: 12, t.l, f.l (1756); Murray, Syst. Veget., ed. 14, 349 (1784); Willd., Sp. Pl. **2**: (1): 273 (1799), p.p.; Redouté, Liliac. **1**, t.13 (1802), excl. Plukenet; Michx., Fl. Bor.-Amer. **1**: 211 (1803), p.p.; Curtis's Bot. Mag. **20**: t.747 (1804); Pers., Syn. Pl. **1**: 398 (1805), p.p.; Aiton, Hort. Kew., ed. 2, **2**: 330 (1811), p.p.; Spreng., Syst. Veg., ed. 16, **2**: 144 (1825), p.p.; Schult. & Schult., f. Syst. Veg. **7**: 1561 (1830), p.p.; Endl., Gen. Pl., p.135, no. 1066 (1836–1840), p.p.; Kunth, Enum. Pl. **4**: 174 (1843), excl. "*H. ? japonica*"; Gray, Man. Bot., ed. rev., 478 (1859); Baker in J. Linn. Soc. **17**: 467 (1879); Benth., Gen.. Pl. **3** (2): 827 (1883); Engl., Nat. Pfl.-fam. **II.5**: 22 (1888); Britton & A. Br., Ill. Fl. N. States & Canada, ed. 2. **1**: 488 (1913); Krause in Engl. & Prantl, Nat. Pfl.-fam., ed. 2, **15a**: 258 (1930); Hutch., Fam. Flow. Pl. **2**: 85 (1934); Fernald, Gray's Man. Bot., ed. 5, 424 (1950); Gleason, Ill. Fl. NE. U.S. **1**: 406 (1952).

Abalum Adans.[4)], Fam. Pl. **2**: 47, 511 "*Abalon*" (1763), p.p., excl. Plukenet.

Hexonix Rafin. (nom. rejic. vs. *Heloniopsis* A. Gray 1859), Fl. Tellur. **2**: 13 (1837)[5)].

Kozola Rafin. (nom. rejic. vs. *Heloniopsis* A. Gray 1859), Fl. Tellur. **2**: 25 (1837)[5)].

Heloniopsis A. Gray (nom. cons.) in Mem. Amer. Acad. ser. 2, **6**: 416 (1859), excl. charact.

seminum (vide H. Hara 1947, infra cit.); Maxim. in Bull. Acad. Sci. St.-Pétersb. **11**: 436 (1867); Miq. in Ann. Mus. Bot. Lugd.-Batav. **3**: 146 (1867), "*Helionopsis*"; Baker in J. Bot. **12**: 278 (1874), "*Heleniopsis*"; in J. Linn. Soc. **17**: 459 (1879); Franch. & Sav., Enum. Pl. Jap. **2**: 87 (1877)[2], 529 (1878)[2], "*Helionopsis*"; Benth., Gen. Pl. **3** (2): 827 (1883); Engl., Nat. Pfl.-fam. **II. 5**: 22 (1888); Krause in Engl. & Prantl, Nat. Pfl.-fam., ed. 2, **15a**: 259 (1930); Hutch., Fam. Flow. Pl. **2**: 86 (1934); H. Hara in J. Jpn. Bot. **21**: 148 (1947); Ohwi, Fl. Jap., ed. rev., 336 (1975); S.C. Chen, Fl. Reip. Pop. Sin. **14**: 15 (1980); Satake in Satake et al., Wild Flow. Jap. **1**: 26 (1981).

Sugerokia Miq. in Ann. Mus. Bot. Lugd.-Batav. **3**: 144 (1867)[1]; Koidz., Fl. Symb. Or.-Asiat. 94 (1930).

Ypsilandra Franch. in Nouv. Arch. Mus. Hist. Nat. Paris sér. 2, **10**: 93, t. 17 (1887); Pl. David. **2**: 132, t. 17 (1888); Krause in Engl. & Prantl, Natürl. Pfl.-fam., ed. 2, **15a**: 260 (1930); Hutch., Fam. Flow. Pl. **2**: 85 (1934); S.C. Chen, Fl. Reip. Pop. Sin. **14**: 15 (1980); G.H. Yang, Fl. Sichuan. 7: 11 (1991); Noltie, Fl. Bhutan **3**(1): 90 (1994).

Perennial glabrous herb. Rhizome stout, conical to tuberous, bearing many fibrous roots. Leaves many in a basal rosette, evergreen, oblanceolate, narrowly oblanceolate or spatulate-oblanceolate, acute to acuminate at apex with a short pointed tip, attenuate to base. Scape erect or ascending, simple, terete, with several short scaly leaves, 1–45 cm in height at anthesis. Inflorescence racemose to umbellate, bearing many to few flowers, usually ebracteate (except *H. kawanoi*). Flowers pedicellate, cup-shaped or campanulate, with a strong to weak fragrance. Tepals 6, oblanceolate, elliptic, narrowly elliptic, narrowly oblong or linear-oblanceolate, equal in length, 4–16.5 mm long, nectariferous on the ventral side near base, persistent. Neighbouring tepals connate or free at base. Stamens 6, about as long as or exceeding tepals; anthers ovate, oblong or hippocrepiform, extrorse to latrorse, unilocular or virtually bilocular; filaments filiform, persistent, outer filaments free from ovary, while inner ones free from or adnate basally to ovary. Both whorls of filaments adnate basally to or free from their corresponding tepals. Gynoecium 1, tricarpellate. Style either simple with a capitate to depressed capitate stigma, or divided to various degrees in 3, of which ventral side is stigmatic. Ovary superior, globose, ellipsoid or obovate, trilobed to trigonous, stipitate or estipitate, trilocular, with ovules on the central marginal placenta. Capsules trilobed, loculicidally dehiscent. Seeds coated with a whitish to brownish soft testa, fusiform to linear, tailed at both ends. Flowering generally in spring, except *H. kawanoi* which flowers in summer to autumn. One species (*H. bullata*) distributed in eastern N. America, while the other eight species in Asia. Chromosome number 2n = 34.

Type species: *Helonias bullata* L.

Key to the species

1. Style trilobed or trisected 2
1. Style not distinctly lobed, with a capitate to depressed capitate stigma 4
2. Style shortly trilobed, with the columnar part being c.6 mm long. Flowers 2–3 per scape. Tepals linear to linear-oblanceolate .... 3) *H. alpina*
2. Style (trifid–) triparted to trisected, with the undivided (columnar) part being less than c.1.5 mm long. Flowers usually more than c.5 per scape. Tepals elliptic to oblanceolate 3
3. Undivided columnar part of style to c.1.5 mm long. Flowers c.5–15 per scape. Seeds c.0.5–0.7 mm broad[6) .. 2) *H. yunnanensis*
3. Undivided part of style to c.0.5 mm long. Flowers c.30–72 per scape. Seeds c.0.8–1.0 mm broad .... 1) *H. bullata*

4. Anthers unilocular. Inner filaments adnate basally to ovary .... 4) *H. thibetica*
4. Anthers virtually bilocular (thecal confluence at apex rudimentary). Inner filaments free from ovary 5
5. Filaments not adnate to their corresponding tepals. Neighbouring tepals free from each other 6
5. Filaments adnate basally to their corresponding tepals. Neighbouring tepals distinctly connate at base 8
6. Flowering in late summer to autumn. Tepals usually less than 6 mm long .... 7) *H. kawanoi*
6. Flowering in spring. Tepals usually more than 6 mm long 7
7. Inflorescence racemose. Flowers usually nodding, campanulate, white, occasionally become tinged with pink after a peak of flowering. Fragrance very weak. Tepals narrowly elliptic to narrowly oblong, 9.5–14.5 mm long, slightly reflexed at apex. Leaves lustrous above, to 31 cm long, 5 cm wide .... 5) *H. leucantha*
7. Inflorescence umbellate (occasionally subumbellate). Flowers not necessarily nodding, cup-shaped, white to pink, fragrant. Tepals oblanceolate, 8–12 mm long, not necessarily reflexed at apex. Leaves to c.16 cm long, 2.2 cm wide ...... 6) *H. umbellata*
8. Leaves relatively thick (papery to subcoriaceous), lustrous above. Flowers usually pink. Bottom of nectary sac usually located below the level of ovary base. Tapels 9.5–16.5 mm long .... 8) *H. orientalis*
8. Leaves relatively thin (papery), often minutely undulate on margins. Flowers white or tinged slightly with pink. Bottom of nectary sac usually located above the level of ovary base. Tepals 8.3–11.7 mm long .... 9) *H. breviscapa*

Enumeration of the species

1) **Helonias bullata** L.[3], Sp. Pl., ed. 1, **1**: 342 (1753), ed. 2, **1**: 485 (1762), p.p., excl. Plukenet; Amoen. Acad. **3**: 12, t.l, f.l, (1756); Willd., Sp. Pl. **2**(1): 273 (1799), p.p., excl. Plukenet; Redouté, Liliac. **1**: 13 (1802), p.p., excl. Plukenet; Aiton, Hort., Kew. ed. 2, **2**: 330 (1811); Kunth, Enum. Pl. **4**: 174 (1843); Baker in J. Linn. Soc. **17**: 468 (1879); Britton & A. Br., Ill. Fl. N. States & Canada, ed. 2, **1**: 488 (1913); Gleason, Ill. Fl. NE. U.S. **1**: 406 (1952); Radford et al., Man. Vasc. Fl. Carolinas, 299 (1964); Rickett, Wild Flow. U. S. **1**(1); 40, pl. 8 (1965); Utech in Ann. Carnegie Mus. **47**: 169 (1978).

Veratrum (Americanum) racemo simplicissimo, caet. Miller, Gardners Dictionary, ed. 8, n.4 (1768).

Veratrum scapo fistuloso squamoso, spica stricta. Trew, Pl. Select. n.41, t.77 (1771), p.p.

Helonias latifolia Michx., Fl. Bor.-Amer. **1**: 212 (1803); Pers., Syn. Pl. **1**: 398 (1805); Spreng., Syst. Veg. ed. 16, **2**: 144 (1825).

Distribution: Eastern North America.

Note: Chromosome number 2n = 34 (Utech 1980, Tanaka unpub.).

Specimens examined.

North America. New Jersey. Morris Co., Budd's lake K.K. Mackenzie 1209, May 7, 1905, fl., June 11, 1905, fr., E); Hort. Edin. [cult. plants at Royal Bot. Gard. Edinb., May 14, 95 (1895 ?), fl. E]; Cult. plant at Royal Bot. Gard. Edinb., acces. n.19694729. Transplanted at Teikyo Univ., Tokyo (N. Tanaka s.n., Jun. 20, 1996, Biol. Lab., Teikyo Univ.).

2) **Helonias yunnanensis** (W.W.Sm. & Jeffrey) N.Tanaka, comb. nov.

Ypsilandra yunnanensis W.W.Sm. & Jeffrey in Notes Roy. Bot. Gard. Edinb. **9**: 143 (1916); Hand.-Mazz., Symb. Sin. **7**: 1192 (1936); Anonym., Icon. Cormophyt. Sin. **5**: 425, t.7680 (1976); S.C. Chen, Fl. Reip. Pop. Sin. **14**: 17, t.5 (1980).

Ypsilandra yunnanensis W.W.Sm. & Jeffrey var. *micrantha* Hand.-Mazz. in Anzeig. Akad. Wiss. Wien Math. Naturw. Kl. **60**: 155 (1923); Anonym., Icon. Cormophyt. Sin. **5**: 425 (1976).

Ypsilandra yunnanensis W.W.Sm. & Jeffrey var. *himalaica* Hara in H. Hara et al., Enum. Flow. Pl. Nepal **1**: 80 (1978); Noltie, Fl. Bhutan **3**(1): 90 (1994).

Distribution: Nepal, Bhutan, Tibet, Yunnan and Myanmar.

Note: Hara (1978) distinguished the dwarf and small flowered form of *Ypsilandra yunnanensis* as var. *himalaica*, but this form seems not to be clearly distinguished from the typical form (var. *yunnanensis*) due to the presence of intermediate forms. For instance, as for tepals, Hara (1978) reported that they are 2–3.5 mm long in var. *himalaica.* Noltie (1994) reported that the tepals of var. *himalaica* are (2.5–) 3–4.3 mm long. In my observations, the tepals of a syntype of *Y. yunnanensis* (G. Forrest 12055, E) were c.4.5–5.5 mm long. Therefore, there is no appreciable difference in the tepal length between the syntype (var. *yunnanensis*) and var. *himalaica.* As a matter of fact, in the specimens I examined the tepals varied in length from c.2.7 to 6.5 mm almost continuously. Further, no other qualitative difference was observed between the two varieties. Accordingly, var. *himalaica* appears to be inseparable from the typical form.

In the meantime, a similar dwarf and small flowered form of *Y. yunnanensis* was reported by Handel-Mazzetti (1923) from the northwestern part of Yunnan, China, and named as *Y. yunnanensis* var. *micrantha* Hand.-Mazz. According to him, the perianth and stamens of this variety are 3–5 mm long and the flowering plants are not more than 6 cm in height. This variety was later reduced to *Y. yunnanensis* by Handel-Mazzetti himself (1936) and by Chen (1980), and I also agree with this reduction by them.

Representative specimens examined.

China. Yunnan, Mekong-Salween divide, lat. 28°10'N, alt. 12000 ft (G. Forrest 14961, Sept. 1917, fr., E); Yunnan, Shweli-Salween divide, lat. 25°20'N, alt. 9000 ft (G. Forrest 12055, Aug. 1913, fl.–Syntype, E.); N.W. Yunnan, Mekong-Salween watershed, mountains above Tseku and Tsehchung (J.F. Rock 10091, 1923, fl., E), Nepal. Kasuwa Khola, 13000 ft (L.W. Beer 25356, Aug. 21, 1975, fr., TI); ibid., 14000 ft (J.D.A. Stainton 7063, Jun. 1, 1974, fl., TI); Middle Nepal. South of Anna purna, Kaski District, above Siklis, 18 km NNE of Pokhara, alt. c.4300 m (R.G. Troth 219, May 23, 1972, fl., TI).

3) **Helonias alpina** (Wang & Tang) N. Tanaka, comb. nov.

Ypsilandra alpina Wang & Tang in Bull. Fan Mem. Inst. Biol. Bot. **7**: 81 (1936); S.C. Chen, Fl. Reip. Pop. Sin. **14**: 18 (1980).

Distribution: Tibet and Yunnan.

Specimen examined.

Frontier of Tibet and Burma, Sarig hku wang, 28°8'N, 97°24'E, alt. 14000 ft (F. Kingdon Ward 7084, 9.7.1926, fl.–Type, E.).

4) **Helonias thibetica** (Franch.) N.Tanaka, comb. nov.

Ypsilandra thibetica Franch. in Nouv. Arch. Mus. Hist. Nat. Paris sér. 2, **10**: 93, t.17 (1887); Pl. David. **2**: 132, t.17 (1888); Diels in Engl. Bot. Jahrb. **29**: 240 (1900); Anonym., Icon. Cormophyt. Sin. **5**: 425, t.7679 (1976); S.C. Chen, Fl. Reip. Pop Sin. **14**: 17, t.4 (1980); G.H. Yang, Fl. Sichuan. **7**: 11, pl. 3, f.1–3 (1991).

Ypsilandra cavaleriei H. Lév. & Vaniot in Mem. Pont. Accad. Rom. Nuovi Lincei **23**: 375 (1905); Anonym., Icon. Cormophyt. Sin. **5**: 425 (1976); S.C. Chen, Fl. Reip. Pop. Sin. **14**: 17 (1980).

Ypsilandra kansuensis R.N. Zhao & Z.X. Peng in Act. Bot. Bor.-Occ. Sin. **7**(1): 57, f.1 (1987).

Distribution: China; Gansu, Sichuan, Guizhou, Hunan, Guangxi and Guangdong.

Note: According to Chen (1980), *Ypsilandra thibetica* and *Y. cavaleriei* have some differences in floral characters. For example, the two species are reported to differ in the extent of lobation of ovaries. That is, the lobation of ovaries of *Y. thibetica* is deeper than that of *Y. cavaleriei*, the lobed part of the former species being 2/5–1/3 of the entire ovary length, while that of the latter being 1/4–1/5. However, in my observations there was no significant difference in the extent of the ovary lobation between the two species. Chen (1980) also reported that at flowering time the stamens and pistils of *Y. thibetica* far exceed the perianth, while those of *Y. cavaleriei* only slightly exceed the perianth. In the specimens I examined a similar tendency was present, but at the same time, there were also some individuals that show the intermediate state concerning the lengths of these floral organs (e.g., Cavalerie 1291, E). As for the floral size, Chen (1980) reported that the tepals of *Y. cavaleriei* are 4–6 mm long, while those of *Y. thibetica* are 6–10 mm long. This report indicates that the variation of the tepal length is virtually continuous between the two species. In fact, in my material the tepal length varied from 4 to 10.6 mm without any significant gap. Judging from all these observations, *Y. thibetica* and *Y. cavaleriei* seem not to have a marked difference to be distinguished from each other in specific rank.

Zhao and Peng (1987) described *Y. kansuensis* as a new species from southern Gansu, China. According to them, this species differs from *Y. thibetica* in having deflexed linear-oblanceolate leaves being 3–9 mm wide, a flowering scape shorter than leaves, a raceme with secund flowers, pedicels shorter than the perianth, stamens nearly as long as tepals, obtriangular capsules which are 1 cm in diameter, triparted almost to the central axis, and of which the lobes are patent, etc. However, many of these characters are also often seen in *Y. thibetica.* As far as the original description and figure of *Y. kansuensis* were surveyed, *Y. kansuensis* seems not to have a sufficient difference worthwhile of its specific delimitation from *Y. thibetica.*

It was in the course of preparing this paper that I knew of the existence of a report on *Y. kansuensis* by Zhao and Peng. Accordingly, the geographical range of *Y. thibetica* depicted in Fig. 3 of my paper (Tanaka 1997e) does not include the locality in Gansu.

Chromosome number 2n = 34 (Tanaka unpub.).

Representative specimens examined.

China. Sichuan. Mt. Omei, cult. at Nikko Bot. Gard. Univ. Tokyo [May 12, 1996, (fl.)–fr. MAK]; Guizhou, Pin-fa, montagnes, liux humides (J. Cavalerie 1291, Mars 10, 1902, fl., E); Guizhou. alt. 1450 m (J. Esquirol 2013, Avril 1910, fl., E); S.E. Guizhou, environs de Touchan, dans la montagne (J. Cavalerie 2638, Juin 3, 1899, fr. – Type of *Ypsilandra cavaleriei*, E); Wild origin unknown (plants obtained from cultivated sources in Japan), cultivated at Teikyo University (N. Tanaka s.n., Apr. 6, 1986, fl. – only flowers; Jun. 8, 1986, fr.; March 6, 1988, fl.; Apr. 24, 1988, fl.-fr.; March 14, 1989, fl.; May 20, 1994, fr., Biol. Lab. Teikyo Univ.).

5) **Helonias leucantha** (Koidz.) N. Tanaka, comb. nov.

Sugerokia leucantha Koidz. in Acta Phytotax. Geobot. **6**: 46 (1937).

Heloniopsis leucantha Koidz. in Acta Phytotax. Geobot. **6**: 46 (1937), pro syn.; Masam., Enum. Tracheophyt. Ryukyu Insul. **9**: 103 (1957); Hatus. & Amano, Fl. Okinawa 141 (1958); Walker, Fl. Okinawa & S. Ryukyu Isl. 304 (1976).

Heloniopsis leucantha (Koidz.) Honda in Bot. & Zool. **6**: 1680 (1938); Hatus. & Amano, Fl. Ryukyus, South of Amami Isl. 198 (1977), ed. 2, 303 (1994); Shimab., Check List Vasc. Fl. Ryukyu Isl. 520 (1990).

Heloniopsis leucantha (Koidz.) Hatus., Fl. Ryukyus 786 (1971), ed. added & corrected, 786 (1975), comb. nud.

Japanese name: Ô-shiro-shôjôbakama (Koidzumi 1937).

Distribution: The Ryûkyû Islands (Tokunoshima, Okinawa, Ishigaki and Iriomote Islands).

Note: Hatusima (1971, 1975) noted that *Heloniopsis leucantha* and *H. acutifolia* may not be different species. But, the latter differs from the former in having a more slender scape, fewer flowers a scape, an umbellate inflorescence, oblanceolate tepals, etc. These two taxa can be regarded as distinct species. In this paper, however, *H. acutifolia* was treated as conspecific with *Helonias umbellata* [see the next entry (6)]. Chromosome number 2n = 34 (Tanaka unpub.).

Representative specimens examined.

Japan. Okinawa Pref. Okinawa Isl.: Kunigami-gun, Haneji-son, Mt. Taniyu-dake (T. Kanashiro 162, Jan. 5, 1938, fl., RYU 2508); Haneji-son, Makiya-ku, Uishigâyama (S. Nakamine 322, Nov. 29, 1954, RYU 41828, TNS 116547, 116548); Ôgimi-son, Nûhaôgawa (T. Amano 6331, Aug. 16, 1951, TNS 129705); Nago-shi. Meijiyama (H. Higa, Jan. 31, 1975, fl., RYU 35723); near Meijiyama Bot. Gard. (no collector name, fl., RYU 10041). Ishigaki Isl.: (Y. Niiro, Aug. 1958, RYU 19301). Iriomote Isl.: Mt. Komidake, alt. 400 m. (T. Yamazaki, June 17, 1971, TI), ibid. (S. Hatusima 35249, Aug. 3, 1973, RYU 12555); Urauchi R., alt. 150 m (T. Yamazaki, June 13, 1971, TI).

6) **Helonias umbellata** (Baker) N.Tanaka, comb. nov.

Heloniopsis umbellata Baker in J. Bot. **12**: 278 (1874), "*Heleniopsis*"; in J. Linn. Soc. Bot. **17**: 460 (1879); Wright in J. Linn. Soc. Bot. **36**: 140 (1903); Matsum., Ind. Pl. Jap. **2**(1): 197 (1905); Matsum. & Hayata in J. Col. Sci. Imp. Univ. Tokyo **22**: 442 (1906); Makino & Nemoto, Fl. Jap., 1260 (1925), ed. 2, 1547 (1931); Anonym., Icon. Cormophyt. Sin. **5**: 426, t.7681 (1976); Liu & Ying, Fl. Taiwan **5**: 55 (1978); S.C. Chen, Fl. Reip. Pop. Sin. **14**: 15, t.3 (1980).

Heloniopsis acutifolia Hayata, Ic. Pl. Formos. **9**: 144, f.53 (1920); Makino & Nemoto, Fl. Jap. 1259 (1925), ed. 2, 1547 (1931).

Sugerokia acutifolia (Hayata) Koidz., Fl. Symb. Ori.-Asiat. 95 (1930).

Sugerokia umbellata (Baker) Koidz., Fl. Symb. Ori.-Asiat. 95 (1930).

Heloniopsis arisanensis Hayata ex Honda in Bot. & Zool. **6**(10): 1679 (1938).

Sugerokia arisanensis (Hayata ex Honda) Koidz. in Acta Phytotax. Geobot. **8**: 53 (1939).

Heloniopsis orientalis (Thunb.) C. Tanaka var. *yakusimensis* auct. non (Masam.) Ohwi: Masam., Enum. Tracheophyt. Ryukyu Insul. **9**: 103 (1957), p.p.

Heloniopsis taiwaniana Ying, Col. Ill. Herb. Pl. Taiwan **1**: 222, f.108 (p.67) (1980).

Japanese name: Hime-shôjôbakama (Hayata 1917), Shima-shôjôbakama (Kawakami 1910).

Distribution: Taiwan.

Note: According to Hayata (1920), *Heloniopsis acutifolia* differs from *H. umbellata* in having longer anthers and acute leaves. But, in my observations these two species do not differ significantly in these characters, and coincide well with each other in many characters. Therefore, I regard *H. acutifolia* as conspecific with *H. umbellata*, as Chen (1980) has already done. There also seems to be no ground to accept *Heloniopsis arisanensis* Hayata ex Honda as a distinct species. This species was described as differing from *H. umbellata* in having very short-pedicellate flowers. But, in many respects this species accords well with *H. umbellata*, and falls under the variation range of the latter species. The flowers of the type specimen of *H. arisanensis* still seem to be in the young stage. Both pistils and stamens are short. The anthers are still not dehisced, and the stigmas appear to be somewhat immature. The short pedicels of this specimen may partly be due to this early stage of development. Meanwhile, *Heloniopsis taiwaniana* was described by Ying (1980) as a new species near *H. orientalis*. But, judging from his description and colour photograph, it appears that his species is nothing but *H. umbellata*. He described *H. taiwaniana* as having greenish perianth-segments, but his specimen was collected as late as April 20 in the northern part of Taiwan at altitudes between ca. 300–1000 m. It is a general habit that the perianths of *H. umbellata* turn greenish after anthesis. The flowers of *H. taiwaniana* in his photograph are apparently after a peak of flowering. Therefore I also regard *H. taiwaniana* as conspecific with *H. umbellata*.

As far as I am aware, *Helonias* in Taiwan is represented by only one endemic species, *H. umbellata*. Chromosome number 2n = 34 (Chuang et al. 1962, Hsu 1971, Tanaka unpub.).

Representative specimens examined.

Taiwan. Taipei Co.: Yanmingshan to Mt. Chihsing, alt. 600–1100 m (T. Shimizu 11117, Feb. 26, 1961, fl., TI); Mt. Chihsing (Shichiseizan) (N. Fukuyama 3015, Jan. 25, 1932, fl., TNS 59639), ibid. (S. Sasaki & T. Sôma, Feb. 21, 1921, fl., TNS 321215); Mt. Tatun (Daitonzan) (S. Sasaki, Apr. 20, 1932, fr., TNS 321209), ibid. (T. Satô 127, Oct. 26, 1935, TI); Tatunshan–Hsinpeitou (I. Sasaki 831, Oct. 11, 1965, TI). Ilan Co.: Mt. Taiping (alt. 2000 m, M. Tamura et al. 21439, Jul. 30, 1963, fr., TI), ibid. (C.C. Chuang & M.T. Kao 4088, Mar. 2, 1966, fl., TI), ibid. (M.T. Kao 6796, Mar. 4, 1967, fl., TI); Mt. Bonbon-zan (May 10, 1917, fl. – Type of *Heloniopsis acutifolia* Hayata, TI). Taichung Co.: Mt. Lee-shan (C.S. Feung & M.T. Kao 4554, Apr. 20, 1962, fr., TI). Chiayi Co.: Mt. Alishan (Arisan), 2500 m (U. Faurie 942, Jun. 1914. – Type of *Heloniopsis arisanensis* Hayata ex Honda, TI). Taitung Co.: Chinshuiying (Sinsuiei) (S. Sasaki, Feb. 10, 1925, fl., TNS 321217). County unspecified: Central mountains, Abi-sen (T. Kawakami & S. Sasaki, Jan. 2, 1911, fl., TI).

7) **Helonias kawanoi** (Koidz.) N.Tanaka, comb. nov.

Heloniopsis kawanoana Koidz. in S.Sakag., Gen. Index Fl. Okinawa 86 (1924), nom. nud.

Sugerokia Kawanoi Koidz. in Acta Phytotax. Geobot. **6**: 46 (1937).

Heloniopsis Kawanoi Koidz. in Acta Phytotax. Geobot. **6**: 46 (1937), pro syn.; Hatus. & Amano, Fl. Okinawa 141 (1958).

Heloniopsis Kawanoi (Koidz.) Honda in Bot. & Zool. **6**: 1680 (1938); Walker, Fl. Okinawa & S. Ryukyu Isl. 304 (1976), excl. syn. "? *H. orientalis* var. *yakusimensis* (Masam.) Ohwi"; Shimab., Check List Vasc. Fl. Ryukyu Isl., 520 (1990); Hatus. & Amano, Fl. Ryukyus, South of Amami Isl., ed. 2, 303 (1994).

Heloniopsis orientalis (Thunb.) C. Tanaka var. *yakusimensis* auct. non (Masam.) Ohwi: Masam., Enum. Tracheophyt. Ryukyu Insul. **9**: 103 (1957), p.p.

Heloniopsis umbellata auct. non Baker: Hatus., Fl. Ryukyus 786 (1971), ed. added & corrected, 786 (1975); Hatus. & Amano, Fl. Ryukyus, South of Amami Isl. 198 (1977).

Japanese name: Ko-shôjôbakama (Koidz. 1937) – Okinawa-shôjôbakama (Sakaguchi 1924).

Distribution: The Ryûkyû Islands (Amami-ôshima, Tokunoshima, Okinawa, Miyako, Ishigaki and Iriomote Islands).

Note: This species has occasionally been confused with *Helonias umbellata* of Taiwan, but these two species can clearly be distinguished from each other, and can be regarded as different species. Chromosome number 2n = 34 (Tanaka unpub.).

Representative specimens examined.

Japan. Kagoshima Pref. Amami-ôshima Isl.: Mt. Yuwan-dake (T. Amano 6500, May 20, 1951, RYU 25059). Okinawa Pref. Okinawa Isl.: Kunigami, Aha, Tanagâ-gumui (T. Amano 7474, Dec. 21, 1954, RYU 28030, TNS 116896), ibid., alt. 100 m (S. Hatusima 18309, Jun. 24, 1955, fr., TI; T. Yamazaki, Jun. 23, 1971, TI). Miyako Isl.: T. Ito 1202, Aug. 9, 1894, TNS 60738). Ishigaki Isl.: Mt. Omoto-dake (Y. Niiro, Nov. 5, 1958, late fl., RYU 19300). Iriomote Isl.: Gozadake (T. Yamazaki, Dec. 26, 1963, fr., TI, RYU 27147); Ôtomi (M. Furuse 1080, Sept. 19, 1972, fl., RYU 5724); Urauchi R., by the upper stream (M. Furuse 4414, Oct. 26, 1973, RYU 17010).

8) **Helonias orientalis** (Thunb.) N.Tanaka, comb. nov.

Scilla bifolia auct. non L.: Thunb., Fl. Jap. 138 (1784).

Scilla orientalis Thunb. in Trans. Linn. Soc. **2**: 334 (1794); Willd., Sp. Pl. **2**(1): 129 (1799); Pers., Syn. Pl. **1**: 365 (1805); Thunb., Pl. Jap. Nov. Sp. 6 (1824); Schult. & Schult.f., Syst. Veg. **7**(1): 570 (1829); Kunth, Enum. Pl. **4**: 330 (1843).

Heloniopsis pauciflora A. Gray in Mem. Amer. Acad. Art. Sci. new ser. **6**: 416 (1859); Maxim. in Bull. Acad. Imp. Sci. St. Pétersb. **11**: 436 (1867); Franch. & Sav., Enum. Pl. Jap. **2**: 87 (1877)[2], "*Helionopsis*"; Baker in J. Linn. Soc. **17**: 460 (1879), excl. Miq.

Sugerokia japonica Miq. in Ann. Mus. Bot.

Lugd.-Bat. **3**: 145 (1867)[1] p.p.?

Heloniopsis japonica (Miq.)[7] Maxim. in Bull. Acad. Imp. Sci. St. Pétersb. **11**: 437 (1867); Franch. & Sav., Enum. Pl. Jap. **2**: 87 (1877)[2] "*Helionopsis*", p.p.; Baker in J. Linn. Soc. **17**: 460 (1879), p.p.; in Bot. Mag. **114**: t. 6986 (1888), p.p.; Wright in J. Linn. Soc. Bot. **36**: 140 (1903), p.p.; Makino in Iinuma, Y., Sômoku-Dzusetsu **2**: 48, pl. 48 (p.378) (1910); Miyabe and Kudo, Fl. Hokkaido & Saghal. **3**: 309 (1932), p.maj.p.; Nakai in Bot. Mag. Tokyo **47**: 242 (1933), p.p., ut auct. (Thunb.); Honda in Bot. & Zool. **6**: 1677 (1938), p.p.; Makino, Ill. Fl. Jap. 758, t. 2274 (1940), ed. rev., 758, t. 2274 (1949).

Heloniopsis grandiflora Franch. & Sav., Enum. Pl. Jap. **2**: 88 (1877)[2], nom. nud., et 529 (1878)[2], "*Helionopsis*".

Heloniopsis breviscapa auct. non Maxim.: Makino in Bot. Mag. Tokyo **5**: 126 (1891); Matsum. Ind. Pl. Jap. **2**(1): 197 (1905), p.p.

Heloniopsis pauciflora A. Gray var. *rubra* H. Koidz. in Shinano Kyôiku, no. **421**: 15 (1921), cum descr. jap.

Heloniopsis orientalis (Thunb.) T. Tanaka (= C. Tanaka) in Bult. Sci. Terkul. Kjusu Imp. Univ. **1**: 200 (Sept. 1925); Ohwi, Fl. Japan, 285 (1953), ed. Engl., 284 (1965), ed. rev. 336 (1975), p.p., quoad var. *orientalis*; Kitam. in Kitam. et al., Col. Ill. Herb. Pl. Jap. (Monocot.) 151 (1964), p.p.; Y.N. Lee, Ill. Fl. & Fauna of Korea **18**: 156, 781, pl. 9, fig. 1 (1976); Okuyama & S. Kobay. in Okuyama ed., Terasaki's Ill. Fl. Jap. 874, t. 3314 (1977); T.B. Lee, Ill. Fl. Korea, 2nd print., 196 (1982); Satake in Satake et al., Wild Flow. Jap. Herb. Pl. **1**: 26 (1982), p.p., quoad var. *orientalis;* H. Ohba in Kimura et Leonov, Thunb. Draw. Jap. Pl. 445 (1994), p.p.

Heloniopsis orientalis (Thunb.) Koidz. in Bot. Mag. Tokyo **39**: 312 (Dec. 1925), excl. syn. Maxim.; Makino & Nemoto, Fl. Jap. ed. 2, 1547 (1931); Terasaki, Nippon Shokubutsu Dzufu 93 (1933), "*Helonoipsis*".

Sugerokia orientalis (Thunb.) Koidz., Fl. Symb. Ori-Asiat. 95 (1930).

Heloniopsis japonica (Thunb.) Maxim. var. *purpurea* Nakai, et var. *sanguinea* Nakai in Bot. Mag. Tokyo **47**: 243 (1933).

Heloniopsis japonica (Thunb.) Maxim. var. *grandiflora* Nakai in Bot. Mag. Tokyo **47**: 243 (1933), quoad basionym.

Heloniopsis japonica (Thunb.) Maxim. f. *lateritia* Nakai ex Honda in Bot. & Zool. **6**(10): 1679 (1938).

Heloniopsis acutifolia auct. non Hayata: Honda in Bot. & Zool. **6**(10): 1678 (1938).

Sugerokia acutifolia auct. non (Hayata) Koidz.: Honda in Bot. & Zool. **6** (10): 1678 (1938).

Heloniopsis orientalis (Thunb.) Koidz. var. *purpurea* Nakai in Bull. Nat. Sci. Mus. **31**: 146 (1952); Kim, Wild Flow. Korea 450 (1988).

Heloniopsis orientalis (Thunb.) C. Tanaka f. *lutea* Mochizuki in J. Geobot. **26**(1): 14 (1978).

Japanese name: Shôjôbakama (K. Itô 1829).

Distribution: Southern Sakhalin, Hokkaidô, Honshû, Shikoku, northern Kyûshû and Korea.

Note: This species usually has pink flowers, but it is known that there is some variation regarding the floral colour; e.g., brick-red, blood-red, red, blue, pale or deep pink, purplish pink, white, pale yellow, or yellow. Chromosome number 2n = 34 (Sato 1942, Nakamura 1967, Tanaka unpub.).

Representative specimens examined.

Japan. Hokkaidô. Sôya. Utanobori (M. Yamanoi, May 6, 1972, fl., TNS 319544). Sarobetsu Genya (H. Hara & S. Kurosawa, Jun. 11, 1976, fl., TI). Kamikawa. Taisetsu Mts., Mt. Asahi-dake (H. Koidzumi, Aug. 3, 1917, fl., TNS 315850, 315851). Hidaka. Mt. Apoi (H. Hara, May 26, 1933, fl., TI).

Honshû. Tôhoku: Aomori Pref. Mt. Hakkôda (K. Hasegawa, Jun. 30, fl., TI). Akita Pref. Senpoku-gun, Mt. Komagatake, alt. 1300 m (Y. Tateishi 2123, Jul. 5, 1975, fl., TI). Iwate Pref. Hienuki-gun, Mt. Hayachine, Odagoe, alt. 1200 m (S. Okuyama 12327, Jul. 18, 1967, fr., TNS 177907). Yamagata Pref. Mt. Gassan (R. Yatabe, Jul. 23, 1887, fl., TI). Kantô: Gunma Pref. Mt. Harunasan (N. Maruyama, May 6, 1948, fl., TNS 81854, 81855). Ibaraki Pref. Taga-gun, Kawajiri-kaigan (M. Komatsuzaki, Apr. 10, fl., MAK 137629). Tokyo. Kôzushima Isl., Mt. Tenjô-san, alt. 400 m (T. Yamazaki, Apr. 14, 1976, fl., TI). Chûbu: Niigata Pref. Mt. Naeba (S. Okuyama, Jul. 19, 1936, fl., TNS 53019). Nagano Pref. Mt. Senjô-dake (H. Koidzumi, Jul. 23, 1923, fl., TNS 315696). Fukui Pref. Takefu, Murakuniyama, alt. 150 m (T. Yamazaki, Mar. 26, 1987, fl., TI). Kinki: Kyoto Pref. Takeno-gun, Yasaka-chô, Midono, alt. 300 m (G. Murata, 20968, fl., TNS 304009). Mie Pref. Mt. Fujiwara-dake (S. Okuyama, fl., TNS 102335, 102338). Chûgoku: Tottori Pref. Saihaku-gun, Daisen-machi, Mt. Daisen (N. side) (K. Midorikawa, 2215, May 14, 1981, fl., TI). Yamaguchi Pref. Hagi-machi (J. Nikai, Apr. 22, 1929, fl., TNS 49293).

Shikoku. Kagawa Pref. Mt. Ôtakiyama (Y. Ujike, Apr. 28, 1939, fr., TNS 79928). Tokushima Pref. Mt. Tsurugisan (H. Kimura, Jun. 5, 1956, fl., TNS 139424). Kôchi Pref. Takaoka-gun, Sakawa-chô, Ogawa, Minezaka (T. Makino, May 21, 1889, fl., MAK 137670).

Korea. Pyongannamdo. Yangdok (Yôtoku) (T. Nakai 12478, Jun. 15, 1928, fr., TI). Kyongsangnamdo. Mt. Chiri-san, c.1600–1700 m (K. Ueda et al. 1220, Jun. 24, 1979, fr., TI 1313106, 1314994).

9) **Helonias breviscapa** (Maxim.) N. Tanaka, comb. nov.

Scilla japonica Thunb.[8] ex Murray, Syst. Veg., ed. 14, 329 (Mai-Jun.[9] 1784), ed. 15, 349 (1798); Thunb., Fl. Jap., 137 (Aug. 1784); Icon. Pl. Jap. **4**, t. 4 (1802); Gmelin, Syst. Nat. **2**(1): 552 (1791); Willd., Sp. Pl. **2**(1): 127 (1799); Pers., Syn. Pl. **1**: 366 (1805); Thunb., Pl. Jap. Nov. Sp., 6 (1824); Schult. & Schult.f. Syst. Veg. **7**(1): 580 (1829); Kunth, Enum. Pl. **4**: 330 (1843).

Sugerokia japonica Miq. in Ann. Mus. Bot. Lugd.-Bat. **3**: 145 (1867)[1], p.p.?; Koidz., Fl. Symb. Ori.-Asiat. 95 (1930).

Heloniopsis pauciflora auct. non A. Gray: Miq. in Ann. Mus. Lugd.-Bat. **3**: 146 (1867), "*Helionopsis*".

Heloniopsis breviscapa Maxim. in Bull. Acad. Sci. St.-Pét. **11**: 436 (1867); Franch. & Sav., Enum. Pl. Jap. **2**: 87 (1877)[2], "*Helionopsis*"; Baker in J. Linn. Soc. **17**: 459 (1879), excl. syn. Franch. & Sav.; Matsum., Ind. Pl. Jap. **2**(1): 197 (1905), p.p.; H. Hara in J. Jpn. Bot. **21**: 148 (1947); Okuyama, Col. Ill. Wild Pl. Japan (10th print.) **1**: 29 (1974); Okuyama & S.Kobay. in Okuyama ed., Terasaki's Ill. Fl. Jap. 874, t. 3315 (1977).

Heloniopsis japonica auct. non Maxim.: Franch. & Sav., Enum. Pl. Jap. **2**: 87 (1877)[2], "*Helionopsis*", p.p.; Makino in Bot. Mag. Tokyo **5**: 126 (1891); Matsum., Ind. Pl. Jap. **2**(1): 197 (1905), p.p.

Sugerokia nipponica Ohwi in Bot. Mag. Tokyo **44**: 566 (1930).

Heloniopsis japonica (Thunb.) Maxim. var. *flavida* Nakai in Bot. Mag. Tokyo **47**: 243 (1933); Honda in Bot. & Zool. **6**: 1679 (1938).

Heloniopsis japonica (Thunb.) Maxim. var. *grandiflora* Nakai in Bot. Mag. Tokyo **47**: 243 (1933), p.p.

Heloniopsis japonica Maxim. var. *yakusimensis* Masam. in Mem. Fac. Sci. & Agr. Taihoku Imp. Univ. **11**: 551 (1934).

Heloniopsis nipponica (Ohwi) Nemoto, Fl. Jap. Suppl. 1058 (1936); Hiyama in Yasô **5**(1): 15 (1939); Okuyama, Col. Ill. Wild Pl. Jap. (7th print.) **6**: 12 (1974).

Heloniopsis japonica Maxim. var. *albiflora* Honda, et var. *breviscapa* (Maxim.) Honda in Bot. & Zool. **6**: 1678 (1938).

Heloniopsis japonica Maxim. var. *tessellata* (Nakai) ex Honda in Bot. & Zool. **6**: 1679 (1938).

Heloniopsis yakusimensis (Masam.) Honda in Bot. & Zool. **6**: 1679 (1938).

Sugerokia yakusimensis (Masam.) Koidz. in Acta Phytotax. Geobot. **8**: 53 (1939).

Heloniopsis breviscapa Maxim. var. *yakusimensis* (Masam.) H. Hara in J. Jpn. Bot. **21**: 148 (1947).

Heloniopsis breviscapa Maxim. var. *flavida* (Nakai) Hara, et var. *albiflora* (Honda) H. Hara in J. Jpn. Bot. **21**: 149 (1947).

Heloniopsis orientalis (Thunb.) C. Tanaka var. *breviscapa* (Maxim.) Ohwi, Fl. Jap. 285 (March 1953), comb. nud.; in Bull. Nat. Sci. Mus. Tokyo **33**: 68 (July 1953); Fl. Jap. ed.

Engl. 284 (1965), ed. rev. 336 (1975); Satake in Satake et al., Wild Flow. Jap. Herb. Pl. **1**: 26 (1982).

Heloniopsis orientalis (Thunb.) C. Tanaka var. *yakusimensis* (Masam.) Ohwi, Fl. Jap. 285 (March 1953), comb. nud.; in Bull. Nat. Sci. Mus. Tokyo **33**: 68 (July 1953); Fl. Jap. ed. rev. 336 (1975); Masam., Enum. Tracheophyt. Ryukyu Insul. **9**: 103 (1957), p.p., quoad pl. ex Yakushima.

Heloniopsis orientalis (Thunb.) C. Tanaka var. *flavida* (Nakai) Ohwi, Fl. Jap. 285 (March 1953), comb. nud.; in Bull. Nat. Sci. Mus. Tokyo **33**: 68 (July 1953); Fl. Jap. ed. Engl. 284 (1965), ed. rev. 336 (1975); Kitam. in Kitam. et al., Col. Ill. Herb. Pl. Jap. **3**: 151 (1964); Satake in Satake et al., Wild Flow. Jap. Herb. Pl. **1**: 26 (1982).

Heloniopsis orientalis (Thunb.) C. Tanaka subsp. *breviscapa* (Maxim.) Kitam. in Kitam. et al., Col. Ill. Herb. Pl. Jap. **3**: 151 (1964), nom. inval.; Kitam. & Murata in Acta Phytotax. Geobot. **22**(3): 72 (1966).

Heloniopsis yakusimensis (Masam.) Masam., Col. Ill. Fl. Nippon **8**: 11 (1969).

Heloniopsis orientalis C. Tanaka ssp. *breviscapa* Kitam. f. *satsumensis* Doi, Enum. Pl. in Pref. Hiroshima Spont. Nascent. 135 (1983), nom. seminud., cum descrip. jap (p.143).

Heloniopsis orientalis auct. non (Thunb.) Tanaka: H. Ohba in Kimura & Leonov, Thunb. Draw. Jap. Pl. 445 (1994), p.p.

Japanese name: Kochô-shôjôbakama (newly named; after the Japanese name 'Kotjo' recorded by Thunberg (1784) under *Scilla japonica*), Shirobana-shôjôbakama (T. Iwasaki 1824), Tsukushi-shôjôbakama (Honda 1938), Yakushima-shôjôbakama (Honda 1938).

Distribution: Japan. Honshû (southern part of the Kantô district and westward to the Chûgoku district), Shikoku and Kyûshû.

Note: Under *Heloniopsis breviscapa*, Hara (1947) recognized three varieties; var. *yakusimensis*, var. *albiflora* and var. *flavida*, besides the typical form (var. *breviscapa*). But, in my observations these forms cannot clearly be distinguished from each other, due to the presence of intermediate forms.

Helonias breviscapa has its range in the south of the range of its closest species, *H. orientalis*, with some overlap (Tanaka 1997b, 1997e; under the generic name of *Heloniopsis*). The area predominated by *H. breviscapa* is generally characterized by a warmer climate in winter with less snowfall than the area predominated by *H. orientalis*. *Helonias breviscapa* has thinner leaves than *H. orientalis* (Tanaka 1997d, 1997e). It seems likely that this interspecific difference in the leaf texture is related to the difference in the winter climate covering the ranges of the two species. Chromosome number 2n = 34 (Nakamura 1967, Tanaka unpub.).

Representative specimens examined.

Japan. Honshû. Kantô: Chiba Pref. Awa-gun, Amatsu-kominato-chô, Mt. Kiyosumi (T. Makino, Apr. 1896, fl., MAK 137585, 137586), Mt. Kiyosumi (T. Nakai, Apr. 1937, fl. – Type of *Heloniopsis japonica* var. *tessellata* Nakai ex Honda, TI), Mt. Kiyosumi (H. Motomiya, Apr. 5, 1970, fl., TNS 280174). Tokyo. Tama-shi, Sekido (T. Sakai, Apr. 3, 1938 – Type of *Heloniopsis japonica* var. *albiflora* Honda, TI). Kanagawa Pref., Tanzawa Mts., Miyagase (T. Saitô, Apr. 21, 1963, late fl., TNS 156935, 156936). Hakone-machi, Hatajuku – Mt. Shirogane-yama (Y. Tateishi & M. Fukuda 2054, Jun. 18, 1975, TI). Chûbu: Shizuoka Pref. Hakone, Higane-yama (H. Hara, Apr. 15, 1956, fl., TI). Kinki: Mie Pref. Suzuka-gun, Seki-chô, Bandôyama, alt. 250 m (H. Koyama & N. Fukuoka 185, Apr. 3, 1963, fl., TNS 179700). Kyoto. Mt. Hiei (T. Nakai, Mar. 29, 1911, fl., TI). Osaka. Mt. Kongô-san (M. Togashi, Apr. 25, 1963, fl., TNS 105921). Wakayama Pref. Ito-gun, Kôya-chô, near Ôtaki (K. Deguchi 6077, fl., TNS 594690). Kôbe-shi. Mt. Rokkô (S. Kuriyama, Jun. 8, 1928, fl., MAK 137594). Chûgoku: Hiroshima Pref. Sandankyô (H. Hara & S. Kurosawa, Apr. 4, 1976, TI). Yamaguchi Pref. Abu-gun, Mutsumi-mura, Kawahira (N. Miake, Apr. 7, 1971, fl., MAK 130266).

Shikoku. Tokushima Pref. Ôtakijiyama (K. Abe 12166, fl., TNS 132384). Myôdô-gun, Sanagôchi-mura, Sagamyô (J. Nikai, Apr. 30, 1913, fr., TNS 79930). Kôchi Pref. Nagaoka-gun, Ôtoyo-mura, Tachikawa (T.

Makino, May 5, 1893, late fl., MAK 137569).

Kyûshû. Fukuoka Pref. Kitakyûshû-shi, Moji, Adachiyama (T. Hashimoto, Mar. 13, 1952, fl., TI). Ôita Pref. Beppu (H. Koidzumi 42537, fl., TNS 315693). Saga Pref. Ogi-gun, Mt. Hiko-dake (T. Hashimoto, Apr. 22, 1980, fr., TI). Nagasaki Pref. Mt. Unzen (J. Matsumura & G. Koidzumi, Apr. 1911, fl., TI). Kumamoto Pref. Mt. Aso, near Akamizu (H. Koidzumi 42822, fl., TNS 315694). Miyazaki Pref. Minami-naka-gun, obi-chô (M. Nagasawa, Apr. 1946, late fl., TNS 132586). Kagoshima Pref. Mt. Kaimon-dake (T. Sakata, Mar. 30, 1964, fl., TNS 161902). Yakushima Isl. (G. Masamune, Apr. 6, 1927, fl., TI).

Besides the above specimens, I examined a photograph of the type specimen of *Sugerokia nipponica* Ohwi [Nara pref. (Yoshino), between Kashiwagi and Obagamine, J. Ohwi, May 19, 1928, KYO] preserved at TNS (n. 320902).

I thank the staff of the following herbaria for providing me with opportunities to examine the specimens: E, MAK, RYU, TI and TNS. I am also very grateful to the staff of the Botanic Garden of the University of Tokyo for allowing me to refer to some classical botanical books in the library, and to the anonymous reviewers of my manuscripts for advisory comments.

Endnotes

[1] Miquel's description of *Sugerokia* was published also in Vers. Med. Konik. Akad. Wetens. ser. 2, **2**: 88 (1867), and in its reprint (1866), but I could not refer to either paper. For the years of publications of these papers see Stafleu F. A., Wentia **16**: 84 (1966).

[2] Year of publication followed Stafleu and Cowan, Taxonomic literature, ed. 2, **I**: 869–870 (1976).

[3] Linnaeus (1753) and some other authors cited "Morison, Hist. **3**. p. 606, s. 15, t. 2, f. 1." as its plant being identical with *H. bullata*. However, Morison's species is excluded from *H. bullata* in Curtis's Bot. Mag. [**20**, t. 747 (1804)], Schult. & Schult. f. (1830), etc. Unfortunately I could not refer to "Morison" in this study.

[4] Adanson also cited "Morison" (see endnote 3).

[5] Year of publication followed Farr, Leussink and Stafleu, Index Nominum Genericorum (Plantarum) **2**: 917 (1979).

[6] In this study one fruiting specimen of *Helonias yunnanensis* was newly available (Beer 25356, TI). Its seeds were ca.2.3–3.2 mm long and 0.5–0.7 mm broad.

[7] For the basionym of this name, see Hara (1947).

[8] The name *Scilla japonica* Thunb. cannot be used as the basionym in *Helonias*, since in this genus there has been an earlier homonym *Helonias ?japonica* (Willd.) Schult. & Schult. f. [Syst. Veg. **7**(1): 1567 (1830)], which is a synonym of *Chionographis japonica* (Willd.) Maxim.

[9] Month of publication followed Stafleu and Cowan, Taxonomic literature, ed. 2, **3**: 670 (1981).

References

(See also the literature cited in the text)

Baker J. G. 1874. On a new species of *Heloniopsis* from Formosa. J. Bot. Brit. & For. 12: 278.

——— 1879. A synopsis of Colchicaceae and the aberrant tribes of Liliaceae. *Heloniopsis*. J. Linn. Soc. **17**: 459–460.

Bentham G. 1883. *Heloniopsis*. *In*: Bentham G. & Hooker J. D., Genera Plantarum **3**(2), p. 827. L. Reeve, London.

Chen S-C. 1980. *Heloniopsis. Ypsilandra*. *In*: Wang F.-T. and Tang T. (ed.), Flora Reipublicae Popularis Sinicae **14**: 15–16. Science Press, Beijing (in Chinese).

Chuang T., Chao C. Y., Hu W. W. L. and Kwan S. C. 1962. Chromosome numbers of the vascular plants of Taiwan. I. Taiwania **8**: 51–66.

Engler A. 1888. *Heloniopsis*. *In*: Engler A. und Prantl K., Die Natürlichen Pflanzenfamilien. **2**(**5**): 22. Wilhelm Engelmann, Leipzig.

Franchet A. 1887. Plantae Davidianae ex Sinarum Imperio. Part II. *Ypsilandra*. Nouv. Arch. Mus. Hist. Nat. Paris sér. 2, **10**: 93–95, t. 17.

——— & Savatier L. 1877. Enumeratio Plantarum in Japonia Sponte Crescentium. **2**. *Helionopsis*, pp. 87–88. F. Savy, bibliopolam, Paris.

Gray A. 1859. Diagnostic characters of new species of phanerogamous plants, collected in Japan by Charles Wright, botanist of the U.S. north Pacific exploring expedition. *Heloniopsis.* Mem. Amer. Acad. n.ser. **6**: 416.

Hara H. 1947. Annotationes miscellaneae ad plantas Asiae-Orientalis (III). J. Jpn. Bot. **21**: 143–150 (in Japanese).

Honda M. 1938. Species of *Heloniopsis*. Bot. and Zool. **6**: 1675–1680 (in Japanese).

Hsu C. C. 1971. Preliminary chromosome studies on the vascular plants of Taiwan (IV). Counts and some systematic notes on some monocotyledons. Taiwania **16**: 123–136.

Kawano S. and Masuda J. 1980. The productive and reproductive biology of flowering plants VII. Resource allocation and reproductive capacity in wild populations of *Heloniopsis orientalis* (Thunb.) C. Tanaka (Liliaceae). Oecologia **45**: 307–317.

Koidzumi G. 1930. Florae Symborae Orientali-Asiaticae. *Sugerokia*, pp. 94–96. Kyoto.

——— 1934. Shôjôbakama zoku ni tsuite [on the genus *Heloniopsis*]. Acta Phytotax. Geobot. **3**: 42–43 (in Japanese).

Krause K. 1930. *Heloniopsis. In*: Engler A. und Prantl K. (ed.), Die Natürlichen Pflanzenfamilien **15a**: 259–260. Wilhelm Engelmann, Leipzig.

Maximowicz C. J. 1867. Diagnoses breves plantarum novarum Japoniae et Mandshuriae (III). *Heloniopsis.* Bull. Acad. Imp. Sci. St.-Pétersb. **11**(4): 436–437.

Miquel F. A. G. 1867. Prolusio Florae Iaponicae. *Sugerokia. Helionopsis.* Ann. Mus. Bot. Lugd.-Batav. **3**: 144–146.

Nakai T. 1933. Notulae ad plantas Japoniae & Koreae 43. *Heloniopsis japonica.* Bot. Mag. Tokyo **47**: 242–244.

Nakamura T. 1967. Cytological studies in family Liliaceae of Japan. II. The karyotype analysis in the genus *Heloniopsis.* La Kromosomo **71**: 2316–2321 (in Japanese).

Ohwi J. 1953. Flora of Japan. *Heloniopsis*, pp. 285–286. Shibundo, Tokyo (in Japanese).

——— 1965. Flora of Japan. English ed. *Heloniopsis*, p. 284. Smithsonian Institution, Washington, D.C.

Sato D. 1942. Karyotype alteration and phylogeny in Liliaceae and allied families. Jap. J. Bot. **12**: 57–161.

Tanaka N. 1997a. Taxonomic significance of some floral characters in *Helonias* and *Ypsilandra* (Liliaceae). J. Jpn. Bot. **72**: 110–116.

——— 1997b. Evolutionary significance of the variation of the floral structure of *Heloniopsis.* J. Jpn. Bot. **72**: 131–138.

——— 1997c. Phylogenetic and taxonomic studies on *Helonias*, *Ypsilandra* and *Heloniopsis.* I. Comparison of character states (1). J. Jpn. Bot. **72**: 221–228.

——— 1997d. Phylogenetic and taxonomic studies on *Helonias*, *Ypsilandra* and *Heloniopsis.* I. Comparison of character states (2). J. Jpn. Bot. **72**: 286–292.

——— 1997e. Phylogenetic and taxonomic studies on *Helonias*, *Ypsilandra* and *Heloniopsis.* II. Evolution and geographical distribution. J. Jpn. Bot. **72**: 329–336.

Utech F. H. 1980. Somatic karyotype analysis of *Helonias bullata* L. (Liliaceae), with a comparison to the Asian *Heloniopsis orientalis* (Thunb.) C. Tanaka. Ann. Carnegie Mus. **49**: 153–160.

田中教之: ***Helonias, Ypsilandra, Heloniopsis*** の系統と分類 **III.** 分類学的検討

これまでに得られた観察結果（Tanaka 1997a-e）によると，表題の3属は属のランクで区別するほどの顕著な差異を持たないと判断される．従って，これら3属を1属に統合することを試みた．*Ypsilandra* 属と *Heloniopsis* 属は *Helonias* 属に統合される．検討の結果，Helonias属には9種が認められた．この内の1種は北米東部に，他の8種はアジア東部に分布している．本稿には，学名の新組合せによる新名が8含まれている．*Heloniopsis* 属の和名であるショウジョウバカマ属という名称は，3属を統合した場合の*Helonias*属の和名としても使えると思う．

日本産のショウジョウバカマ属（*Helonias*）で，花は白色または少し帯紅紫色，葉はやや薄質で縁がしばしば細かく波状となり，やや黄緑色のものが，関東南部から本州西部，四国，九州に分布している．この種類は今日シロバナショウジョウバカマとツクシショウジョウバカマの2群（あるいはヤマシマショウジョウバカマも区別して3群）に区別されることが多いが，私はこれらを区別せず一種として見なした．これらは明確な差異をもって互いに区別されるというものではない．かっては，九州のものも含めて，上記の分布域に生育する白色系統のものはシロバナショウジョウバカマと呼ばれていた（牧野 1891，Matsumura 1905，Koidzumi 1930)．従って，この種（*Helonias breviscapa*）の和名としてはシロバナショウジョウバカマがふさわしいと考える．しかし，この和名は，紅紫色の花をつける（普通の）ショウジョウバカマ（*H. orientalis*）の白色花をつけるものとこれまでしばしば混同されてきた．この混同は和名だけに留まるものではなかった．名称に由来する混乱を避ける意味から，*H. breviscapa* の和名として新にコチョウショウ

ジョウバカマ（胡蝶猩々袴）の名を与えることにする［この名はThunberg（1784）がかつて*Scilla japonica*（＝*H. breviscapa*）の和名として採録した‘Kotjo’に因む］．ショウジョウバカマの白花品に対してはシロショウジョウバカマ（檜山 1939）の和名がある．ただし，本稿では花色の変異体を分類学的に区別することはしなかった．アジア産8種のうち，日本に分布するのは次の4種である：*Helonias leucantha* オオシロショウジョウバカマ，*H. kawanoi* コショウジョウバカマ，*H. orientalis* ショウジョウバカマ，*H. breviscapa* コチョウショウジョウバカマ．

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頁(Page)	行(Line)	誤(For)	正(Read)
329	↓ 14	to paraphyletic	to be paraphyletic
329	↓ 15	is be presumed	is presumed
335	↓ 16	shinnka	shinka